In The Claims

1. (Original) A two-dimensional free space optical link comprising:

an array of tightly-coupled, multi-wavelength arrays of vertical cavity surface emitting lasers (VCSELs), operating at predetermined wavelengths;

collimating optics for collimating the optical signals emitted from each said multi-wavelength array of VCSELs into a single uniform optical signal; and

an array of tightly-coupled optical receiver arrays, each said receiver array being configured to receive the signals from one of said VCSEL arrays, wherein the wavelengths of the received signals generally match the wavelengths of the signals transmitted by said VCSEL arrays such that multiple optical wavelengths can be simultaneously communicated at high-speed from one of said VCSEL arrays to one of said receiver arrays across a very short haul channel.

2. (Original) The optical link recited in claim 1, wherein said VCSELs are selected from the group consisting of bottom-emitting VCSELs and top-emitting VCSELs.

3. (Original) The optical link recited in claim 1, wherein said VCSEL array is configured as a tightly-bound cluster of VCSELs.

4. (Original) The optical link recited in claim 3, wherein the emitting elements of each VCSEL in said cluster form a small group positioned at the focal point of said collimating optics.

5. (Original) The optical link recited in claim 1, wherein said tightly-coupled optical receiver array of the said receiver arrays comprise partitioned optical filters and mating photodetectors.

6. (Original) The optical link recited in claim 5, wherein said optical filters of each said optical receiver array further comprise multiple segments, each segment having an individual filter element designed to pass a transmitted optical signal with a specific wavelength range.

7. (Original) The optical link recited in claim 5, wherein said photodetectors of each said optical receiver array further comprise multiple segments, each segment having an individual photodetector element that converts the transmitted optical signal received from each said filter element to an electrical signal.

8. (Original) The optical link recited in claim 1, wherein said short haul channel is free space.

9. (Original) The optical link recited in claim 1, wherein said short haul channel is optical fibers.

10. (Currently amended) A method of creating a two-dimensional optical link, the method comprising:

assembling a vertical cavity surface emitting laser (VCSEL) emitter array, wherein the VCSEL emitters in the array are arranged in a regular pattern and each VCSEL emitter is set for a different emissive wavelength;

fabricating a receiver array, wherein the receiver array comprises a plurality of optical filters and mating photodetector arrangements, wherein each optical filter and photodetector arrangement has a plurality of segments, each segment having an individual filter and a mating photodector element where each filter is configured to pass one wavelength and each photodetector converts a specific optical signal with a specified wavelength to an electrical signal; and

mounting the VCSEL emitter array and receiver array onto respective transmitter and receiver electronic circuits configured to receive the respective emitter and receiver arrays.

11. (Cancelled)

12. (Original) The method recited in claim 10, and further comprising transmitting signals from the emitter array to the receiver array through free space.

13. (Original) The method recited in claim 10, and further comprising transmitting signals from the emitter array to the receiver array through optical fibers.

14. (Original) A two-dimensional optical link comprising:

an array of tightly-coupled, multi-wavelength arrays of vertical cavity surface emitting lasers (VCSELs), transmitting signals at predetermined wavelengths;

collimating optics for collimating the optical signals emitted from each said multi-wavelength array of VCSELs into a single uniform optical signal; and

an array of tightly coupled optical receiver arrays, each said receiver array being configured to receive a signal from one of said VCSEL arrays, wherein the wavelengths of the signals received from said VCSEL arrays generally match the wavelengths of the signals transmitted by said VCSEL arrays such that multiple optical wavelengths can be simultaneously communicated at high-speed from said VCSEL arrays to said receiver arrays across a channel.

15. (Original) The optical link recited in claim 14, wherein the signals from said VCSEL arrays are transmitted across the channel, to said receiver arrays through free space.

16. (Original) The optical link recited in claim 14, wherein the signals from said VCSEL arrays are transmitted across the channel to said receiver arrays through optical fibers.

17. (Previously presented) A method of creating a two-dimensional optical link, the method comprising:

assembling an array of tightly-coupled, multi-wavelength arrays of vertical cavity surface emitting lasers (VCSELs), wherein the VCSEL emitters in the array are

arranged in a regular pattern and each VCSEL emitter in the array of tightly-coupled VCSELs is set for a different emissive wavelength;

collimating the optical signals emitted from each said multi-wavelength array of VCSELs into a single uniform optical signal;

fabricating an array of tightly-coupled optical receiver arrays, wherein each receiver array comprises a plurality of optical filters and mating photodetector arrangements; and

mounting the VCSEL emitter array and receiver array onto respective transmitter and receiver electronic circuits configured to receive the respective emitter and receiver arrays.

18. (Previously presented) The method recited in claim 17, wherein each optical filter and photodetector arrangement has a plurality of segments, each segment having an individual filter and a mating photodetector element where each filter is configured to pass one wavelength and each photodetector converts a specific optical signal with a specified wavelength to an electrical signal.

19. (Previously presented) The method recited in claim 17, and further comprising transmitting signals from the emitter array to the receiver array through free space.

20. (Previously presented) The method recited in claim 17, and further comprising transmitting signals from the emitter array to the receiver array through optical fibers.

21. (Previously presented) A two-dimensional free space optical link comprising:

an array of tightly-coupled, multi-wavelength arrays of vertical cavity surface emitting lasers (VCSELs), operating at predetermined wavelengths; and

an array of tightly-coupled optical receiver arrays, each said receiver array being configured to receive the signals from one of said VCSEL arrays, wherein the wavelengths of the received signals generally match the wavelengths of the signals transmitted by said VCSEL arrays such that multiple optical wavelengths can be simultaneously communicated at high-speed from one of said VCSEL arrays to one of said receiver arrays across a very short haul channel.